TRAUMATIC EPITHELIAL CYSTS.

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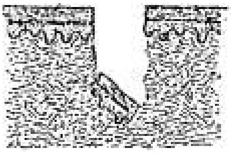
Historical.—This name was given by Garrè to the small epithelial cysts which usually occur on the volar surface of the hand and fingers, and which in his opinion regularly owe their origin to some trauma. Gros and Reverdin were the first to suggest this mode of origin, but it was not until Garrè's paper appeared that careful studies with a view to clearing up this point were made.

According to the usual descriptions, these cysts are small, round or oval tumors, varying in size from a lentil to a walnut or even larger, and are covered by non-adherent skin, which may be normal or present a tiny scar. They are composed of a cyst wall which is easily separated from the surrounding structures, and contain white atheromatous or pultaceous, semi-solid material. The cyst wall is made up—from without inward—of a layer of connective tissue, then of cuboidal and polygonal epithelial cells, which become gradually flattened in the succeeding layers until finally the innermost strata shows only cornified epithelium. Desquamated horny epithelial cells, granular detritus and at times cholesterin crystals fill the interior of the tumor. In short, we have the usual elements of the epidermis, surrounded with connective tissue, but arranged in inverse order so that the stratum corneum is innermost and furnishes the material for the cyst content.

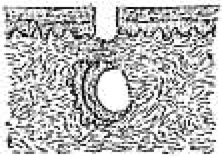
It is because they present features so similar to those of the ordinary sebaceous cyst that the older German authors called them atheromatous cysts. However, their situation in parts wholly devoid of sebaceous glands and the nature of their content made it soon evident that some other reason for their occurrence must be sought. Later, they were regarded as dermoids because of their general characteristics and their epithelial nature. Against this view the following important points were adduced: they were not observed in children, rarely in adolescents, and the usual elements—hairs, teeth, glands; sebaceous material—found in dermoids never occurred. And thus from considerations such as these and from clinical and microscopical study, it became generally accepted that they were purely epidermal structures whose origin could be explained in but two ways, either by the traumatic theory or the theory of fœtal inclusion.

FIG. 1.



Epidermis is displaced; first stage. (After Garre.)

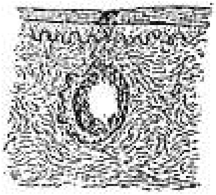
FIG. 2.



Epidermis has grown, and now curls up; second stage. (After Garre.)

The advocates of the traumatic theory think that in the course of an injury such as a puncture, the introduction of a foreign body, or a lacerated wound, a portion of the surface epithelium, with or without its nourishing vessels, becomes detached, and is deposited in the subcutaneous tissues, where it continues to grow and finally forms a cystic tumor. Garrè has depicted the process diagrammatically in his paper, and his figures have been reproduced here (*viz.*, Figs. 1, 2, and 3). It will be seen that the displaced epithelium continues to grow

FIG. 3.



Epithelial Cyst complete. (After Garre.)

in breadth and in thickness. Encountering considerable resistance on all sides, it is forced to curl up, and as it continues to do so, forms a globular structure which is finally converted into a complete sphere. The cyst continues to grow by virtue of the activity of the epithelium, which is constantly pouring cornified epithelium into its interior.

Sufficient clinical and experimental evidence has been presented in the last few years to give great weight to the traumatic theory. Woerz in his reviews of 55 cases finds that 24 gave a distinct history of trauma. Most of the injuries were in the nature of punctured wounds; in one instance a blow with a hammer was held responsible, and in three instances the formation of the cyst followed a panaritium. More recently, Pietzner has collected 73 cases from the literature. In 43 of these trauma is given as the cause, the following various forms having been noted: dog bite, blow with a hammer, incised wound, penetration of a piece of wood, punctured and contused wounds.

Although these data are suggestive, they alone would not be convincing were they not strengthened by experimental observations. Kaufmann in an interesting piece of work showed conclusively that detached, buried epithelium could give rise to so-called atheromatous cysts. His method, which he calls " Enkatarrhaphie," was to separate off an elliptical island of the skin of the cock's comb by clean cut incisions, and then to bury it by suturing the margins of the wound. After a few days the little island of epithelium increased in size, its edges began to turn up, and finally veritable cysts filled with atheromatous masses composed of cornified epithelial detritus were produced. Manasse and Schweninger showed that the detached epithelium need not necessarily be connected with its blood-vessels. The former, experimenting with dogs, found that pieces of epidermis could proliferate when introduced under the skin, or fascia, or even into tendon tissue.

Of interest in this connection is the observation made by von Kummer, who saw an epithelial cyst form about the point of a needle which had been buried in the tissues. Neugebauer cites a case of neurolysis for cicatricial compression of the musculo-spiral nerve. After two unsuccessful operations, the nerve was freed and surrounded by an epidermal graft with a view to the prevention of vicious adhesions. A sinus soon developed and out of it a pultaceous white detritus was evacuated. It was doubtless a case of a partially formed epithelial cyst.

Finally it has been observed that the great majority of the cases occur in men who because of their work are much more exposed to traumatism than are women. But 7 of the 55 cases collected by Woerz were found in the female.

In support of the other view, that these cysts are congenital in origin, we have the publications of Franke, who, although one of the first to recognize their true histological nature, is now generally believed to be wrong in his contention as to their causation. Claiming that they were due to fœtal inclusion, he nevertheless conceded that a traumatism might be instrumental in stimulating their sudden development.

Epithelial cysts also occur in the iris, and Masse was able to produce these experimentally by implanting squamous epithelium. Sutton has aptly termed them implantation cysts and they are frequently called by that name.

Woerz and more recently Pietzner have summed up the main clinical features. The former collected 55 cases, the latter 73 cases from the literature. From Pietzner's review the following conclusions may be drawn: The period of time which elapses between the trauma and the development of the cyst may vary from one month to twenty-four years. In 68 of the cases, the cysts occurred on the hands. But 10 cases were females, 63 males. Most of the tumors were found on the flexor surface of a finger. Forty-three patients gave a history of traumatism. The size of the cysts varied from a hemp-seed to that of a pigeon's egg or even larger. He also questions the validity of Franke's theory as to their embryonal origin from a consideration of his own cases and of the majority of the cases reported.

Own Observations.—I wish to contribute three further examples of this condition to the literature, because of certain points of interest that were observed and because traumatism was undoubtedly responsible for the production of two of the cases.

CASE I.—J. M., male, January, 1907; seen in Dr. Walter Brickner's[1] department, Mt. Sinai Hospital Dispensary. About two months ago he pricked the index finger of his left hand with a sharp nail. He paid no further attention to this slight injury. For the past four weeks he has noticed a little growth at the site of former injury. This has become progressively larger and causes him inconvenience rather than pain.

Examination, January 14, 1907.—Upon the palmar surface of the last phalanx of the left index finger, about at its middle, a small pearly white hemispherical tumor rises abruptly from the surrounding parts. It measures 4 mm. in diameter, has a glistening surface not unlike that of some white vegetable fabric. (Fig. 4. Owing to this peculiar appearance, its true character was not at once recognized; indeed it closely resembled the small parasitic cysts that are so frequently seen in animals. It was easily removed by grasping its protruding portion with a forceps and pulling it out of its bed in the tissues. During this manœuvre its fragile envelope was torn and a white granular cheesy substance, the cyst content, escaped.

Pathological examination.—The cyst is ovoid and measures 4 by 7 mm. Its outer surface is perfectly white, smooth, and glistening. Its wall is homogeneous in character throughout and about the thickness of the ordinary epidermis. It is completely filled with a white pultaceous material not unlike the contents of a sebaceous cyst.

Microscopical examination showed a cyst wall composed of two layers the outer made up of squamous epithelial cells, the inner being a cornified lamellated stratum. Fig. 5[2] shows a cross section of the cyst with its contents in situ. The structure is similar to that of ordinary epidermis with its layers inverted, except that its elements show evidences of the effect of pressure and atrophy. The cells of the rete mucosum (stratum Malpighi)

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[1] I wish to thank Dr. Brickner for his kindness in allowing me to study this case.

[2] I wish to thank Dr. F. S. Mandlebaum, Director of the laboratory, for the preparation of the photomicrograph.

FIG. 2.

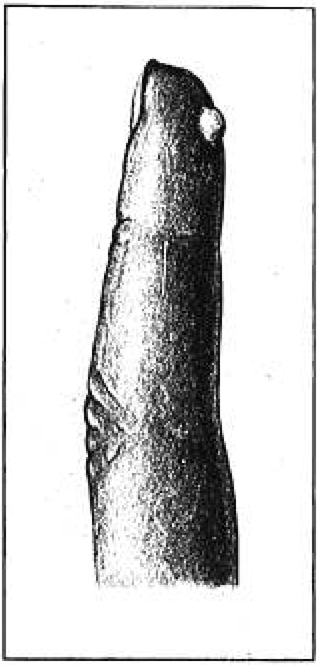
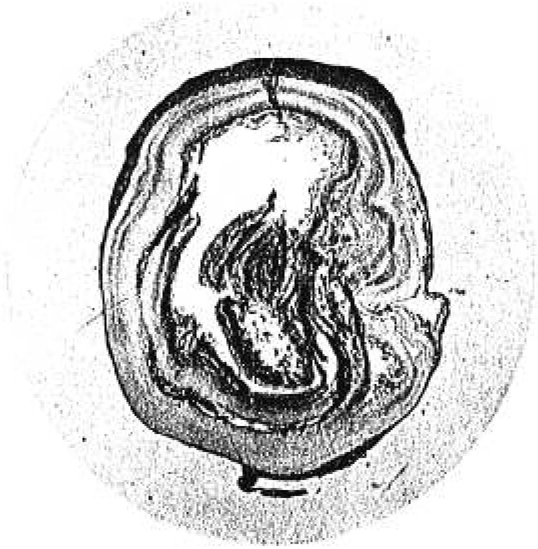


Fig. 5.



are small and atrophic, very much flattened, and the stratum granulosum presents long fusiform cells evidently under considerable pressure. There is no definite stratum lucidum but a thick layer, the stratum corneum, blends with the contents of the cyst. This is composed of desquamated horny cells and detritus.

The unusual feature observed in this case is the fact that the cyst was nowhere covered by normal epidermis and was lying partly without and partly within the tissues. It is difficult to imagine the exact mechanism of its production. Perhaps the displaced epithelium in this case was not carried in very deeply and was covered, when healing took place, by but a thin layer of epidermis. Then, as the cyst increased in size and as its contents began to distend its walls, this thin covering of normal epidermis, by virtue of the pressure from within, gave way and allowed the cyst to protrude beyond the surface of the skin.

CASE 2 is interesting because the mode of development could be observed.

J. K., male, 13 years, came to the Good Samaritan Dispensary (January 20, 1907) in order to have the point of a needle removed from the pulp of the left index finger. A small incision was made and the needle point, about one-eighth of an inch long was removed. The wound healed by primary union. On April 8 the patient returned complaining of the presence of a little hard spot on the same finger, which he said refused to heal.

Near the tip of the palmar surface of the left index finger, at the site of the old incision there is a tumefied area about the size of a split pea. The skin over it is thickened and at its most prominent part presents a tiny opening too small for the entrance of a small surgical probe. On pressing upon the neighboring skin a white granular substance escapes from the opening.

Under cocain anæsthesia the little tumor was circumscribed by an oval incision and excised. A section was made through the mass and the opening found to lead into a small cyst about 4 mm. in diameter and filled with a white granular, cheesy material.

Microscopic examination showed that the cyst wall was composed of normal epidermis whose cornified layer was greatly increased in thickness. The opening on the surface measured less than 1 mm. Here the epidermis could be traced directly into the lining of the cyst. The contents were desquamated and degenerated cornified epithelial cells.

Here again we have an atypical case. Whether the channel which allowed the escape of the cyst contents was secondarily established by traumatism, or whether the displaced epidermis had not been completely detached by the trauma, is an open question. Either one or the other theory could explain the condition.

CASE 3 differs from the other two in that no history of traumatism could be obtained, and is remarkable because of the situation of the cyst.

F. K., female, 39 years, was treated by me at the Good Samaritan Dispensary for chronic mastitis. Under the skin of the breast, near the axillary fold, a pea-sized indurated area began to make its appearance whilst she was under treatment. After a period of 2 weeks had elapsed, the mass became adherent to the skin, the latter became reddened and painful. Owing to the peculiar situation of this indurated area and the fact that similar inflammatory nodules had been previously removed from the breast (with a view at that time of establishing a diagnosis of tuberculous inflammation[3]), I excised the little tumor with a sufficient amount of healthy skin. The wound was sutured and healed by primary union.

Pathological Examination.—Upon section there is a small abscess cavity about 1 cm. in diameter, filled with thick mucoid pus. It lies 0.5 cm. below the skin. The wall of the abscess is composed of squamous epithelial cells arranged in a manner closely resembling that of the epidermis. Externally there is connective tissue, with evidences of acute and chronic inflammation. Then there are a number of layers of squamous epithelial cells which become cornified as we approach the inner strata and finally there is an inflammatory exudate composed of fibrin and polynuclear leucocytes. In the inflammatory zone surrounding the wall of the cavity there are many giant cells of the "foreign body" variety. The epithelial layers are infiltrated with round cells and polynuclear leucocytes.

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[3] I have since concluded, from the pathological examinations, that we were dealing with a case of multiple gummata of the breast.

We were evidently dealing with a small epithelial cyst which had become infected.[4] Lying in the loose subcutaneous tissue near the axilla, its presence was not discovered until, by virtue of the inflammatory exudate externally and into its interior, it became adherent to the skin and palpable. It was far removed from the breast tissue and the sections showed no evidence of breast glands in the vicinity, although a careful search was made for them. We are inclined to believe therefore that it is a true epithelial cyst rather than a product of metaplasia of some preformed glandular structure. No history of trauma could be elicited in this case, and the question as to the origin of the cyst is therefore an open one.

In conclusion I wish to call attention to the points that have been brought out in the study of my three cases. Two of the cases prove conclusively the correctness of the theory that traumatism is responsible for a certain type of epithelial cysts. One of the cases (No. 1) was noteworthy because of the peculiar appearance of the cyst, being, as it were, implanted in the skin and subcutaneous tissues, and lying partly within and partly without the integument of the finger. Apparently we have in Case 3 a cyst similar to those occurring in the hand, but unusual in its situation.

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[4] Staphylococcus was cultivated from the purulent exudate. In all probability there was a beginning gummatous process in the neighborhood of the cyst with secondary infection with staphylococci.

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